



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(54) Title:</b> A METHOD OF VERIFYING THAT A PACKAGE IS UNBROKEN		
<div data-bbox="641 1245 998 1518" data-label="Image"> </div>		
<b>(57) Abstract</b>  The invention concerns a method of verifying that a packet or container (6) is unruptured so that no one has been able to introduce harmful or irrelevant substances in it after manufacture and sealing the packet or container. The invention also permits verification that a sealed packet or container is hermetically sealed and does not leak. This is for example carried out by disposing a marking device gas impermeably against the packet or container and having the marking device provide an indication if the packet or container (6) becomes damaged. The marking device can for example consist of a label (9) which is discoloured in consequence of air contacting the label or of a label which if desired may be provided with a bar code which may change and which is disposed on the packet or container. The change can for example consist in that the label and/or bar code changes colour or that the bar code is supplemented with a warning bar.		

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## A METHOD OF VERIFYING THAT A PACKAGE IS UNBROKEN

This invention refers to a method of verifying that a packet or container is unruptured so that for example no one has been able to introduce harmful or irrelevant substances therein and that the packet or container when being closed  
5 becomes tightly sealed. The method of the invention is characterised by a marking device being positioned on or in the packet or container for providing an indication if the packet or container is subjected to damage and is opened or is not tightly sealed. Further characteristics may be seen  
10 in the subclaims.

The invention can be applied for example if a product is to be packed in a machine and a test is to be carried out to see if the packet or container is sealed. After the packet or container has been sealed its tightness can be  
15 checked visually or automatically by reading/decoding the marking device.

It has at times occurred recently that malicious people have manipulated with i.a. medication packets or containers, candy packets or containers, etc, and have introduced poison  
20 or other dangerous or irrelevant substances into the packet or container. For example, it has become general knowledge that some years ago medication packets or containers were manipulated in this manner in the United States and candy packets or containers were manipulated in Japan. This is a  
25 problem which has created considerable attention in the press and which frightens people.

The present invention has the purpose of preventing

such manipulation. This can be done by the above-mentioned marking device being designed in different ways. For example, it may consist of a label in a casing which communicates hermetically with the interior of the packet or container. The packet or container can in such case for example contain a gas which is unharmed to human beings, for example nitrogen gas. When the gas disappears in consequence of someone having ruptured the packet or container or the packet or container leaking, the label will change its colour. The label can be provided with a bar code, and in such case the bars or their substrate may change colours or one or more bars may swell out so as to provide a warning signal, or otherwise the bar code may be supplemented with one or more warning bars. An additional possibility is to stir the bars mechanically. Still another possibility is to retain the code instead of destroying it but to provide it with a new bar which reacts either to the gas or to the air or the mechanical rupture. Alternatively a bar existing earlier may be removed. The changes may be permanent or for a specific period (long or short) or for a specific time interval.

The above may be illustrated in a very simple manner, for example with a jar of baby food. The label, which if desired may be provided with a bar code, is placed in the cover or the jar or may comprise a portion of the cover or the jar and communicates with the interior of the jar. As long as the jar of baby food contains for example nitrogen gas nothing happens, but if someone has opened it and air has been introduced the label changes. Thus, the colour or the bar code of the label may be changed, for example mechanically, chemically, electrically or photoelectrically.

As may be seen above, the bar code may be changed if desired or its substrate may change its colour when air flows into the packet or container in consequence of one or more holes having been made in the packet or container or the packet or container having been opened. This discolouring may be such, that it may be seen directly in the shelf in the shop where the packet or container is

placed. Another possibility is to "stir" the bars so that they become illegible or that another bar combination is formed.

5 Instead of the label being positioned outside of the packet or container it may be placed in the same, or otherwise a locking device may exist between for example a cover and a jar so as to interconnect them by means of a bridge. If the bridge has been ruptured the packet or container has been opened. For example, in the above-  
10 mentioned jar for baby food a connection may exist from the glass casing to the cover, with said connection being ruptured when the cover is opened so as to provide a marking.

15 Alternatively, the marking device can comprise a portion of a gas and airproof packet or container casing, wherein the marking device is changed if the packet or container has been opened or damaged and leaks. The change may be indicated by air flowing into the casing instead of a gas or vacuum which is there from the beginning. The change  
20 may for example be in the colour of the marking device or a change of a bar code or some other code.

A possibility of detecting the change of the marking device on the relevant packet or container is that a bar code which is intended to be read by the reading pen of a cashier when a person passes out past the cashier's counter  
25 in a shop where the relevant person has purchased the packaged goods has been changed. If the packet or container has been opened the reading pen will immediately issue a warning of this, which may be done for example by an acoustical, visual or electrical signal being delivered when  
30 the reading pen passes the position of change. If a warning signal has been delivered a receipt signal has to be given to the readout apparatus that the warning signal is perceived before the reading apparatus can read and record  
35 the next marking device.

The packet or container may for example comprise a carton, a box, a soft package, a plastic bag, or a plastic jar or glass jar or a tin can etc. What is important is that

the marking device is positioned on the packet or container in such manner that if the packet or container is opened the marking device will change.

5 The marking device should appropriately be positioned on the packet or container at the place of manufacture where quality control of the packet or container is carried out. In this manner it is also possible to check the sealing of the package. If the marking device for example is to be affected by gas or vacuum an unaffected marking device  
10 indicates that the package leaks, i. e. that the gas has gone out and air has come in and that the vacuum has been suspended and air has come in, respectively. The function of the marking device is adapted to the relevant mode of sealing of the packet or container.

15 As has been noted above the invention is not limited to box packages or jars, and it is also possible to have a soft package, for example a plastic bag around a pizza. If someone takes a hypodermic needle and injects something the immediate result is a hole where air comes into the packet  
20 which prior to that for example may be filled with a protective gas or vacuum packed. The bar code in the marking device may for example thereby change its colour.

The invention will be described more specifically below with reference to the accompanying drawings, in which  
25 Figures 1-5 show various applications of the invention and Figures 6A-6C show an example of how a bar code can change in connection with a marking device in accordance with the invention being affected.

Figure 1A shows a vacuum packet for meatballs 1 with an  
30 internal envelope 2 and an external envelope 3, between which two last-mentioned envelopes a gas which is harmless to food is introduced or a vacuum is created. Through an opening 4 in the external envelope the space between the envelopes and thus the gas and vacuum, respectively,  
35 communicates with a marking device 5, for example a label which changes its colour if the gas or vacuum is replaced by air which enters in consequence of the external envelope 3 being punctured somewhere. The label may alternatively be

provided with a bar code which normally, i.e. when the relevant gas and vacuum exist between the internal and external envelopes, respectively, is proper but which changes its character if air enters between the envelopes. Figure 1B shows the envelope in accordance with Figure 1A, but with one single envelope and marking device. Figure 1C shows a packet with a single envelope and a marking device integrated therein. The function of the marking device is the same for all types in accordance with Figures 1A, 1B, and 1C, respectively.

Figure 2A shows a container 6 with contents 7 and with a member 8 for closing the container, to which a marking device 9 is attached, for example a label with or without a bar code. In the closure member 8 there is an aperture 10 which connects the interior of container 6 to the inside of label 9. Analogously to the conditions in Figures 1A-1C container 6 may include an appropriate gas or have a vacuum. If the interior of the container comes into contact with air, for example by the sealing member being opened, the rear side of label 9 is affected and provides a marking in analogous manner to what has been described in connection with Figure 1A. A corresponding description with the marking device on the container applies to Figure 2B.

A portion 8 of a packet or container may alternatively be provided with one or more indicating spots 11 and 12 as shown in Figure 3. If one of these, for example 11, is colourless or has a specific colour the packet or container has not been opened, whereas if the other one, for example 12, has changed its colour this means that the packet or container has been opened and that the colour spot 12 has turned into colour or has changed its colour in consequence of access of air. The change in colour may also mean a change from a condition with colour to colourless or vice versa, which latter is perceived from the above.

Instead of colour spots, light sources can also be utilized in corresponding manner.

Figure 4A shows a further embodiment of a container 13 with a closure member 14 which in one embodiment can be

provided with a marking device 15 analogous to marking device 9 in Figure 2 but which is affected by the rear side being subjected to light or heat when the container 13 is opened and when the sealing member 14 is taken off of the container 13, respectively. In another embodiment a marking device 16 is connected both to the container 13 and to the sealing member 14 and is ruptured when the container is opened. If the sealing member is put in its place again a code disposed on the marking device 16 will not provide the right indication in readout for example by means of a reading pen.

Figure 5 shows a package 17 of ice cream with a marking device 18 which in analogy to the above changes the colour or the pattern of a code marking if the temperature of the package of ice cream exceeds a predetermined value, i.e. if the ice cream is stored in an unpermittedly warm place.

Figures 6A-6C show three examples of a code marking and changes which it can go through if it is subjected for example to air after having been enclosed in gas or a vacuum or by having been actuated by heat or light. Figure 6A shows the code in its original form, i.e. unactuated, wherein the code as an example comprises four code markings 19, 20, 21, and 22, respectively. Figure 6B shows the marking device changed, with the original code marking 19-22 being retained, whereas a new code marking 23 has been added. Figure 6C shows another example of a changed marking device in which the code markings 19, 21 and 22 still remain but the code marking 20 has disappeared. The marking device can have these changes permanently or for a specific time period (long or short) or for a predetermined time interval depending on how it is to function.

The invention is not restricted to the embodiments described above and shown in the drawings, and they may be varied to a high degree. Many other embodiments can also be contemplated. For example some of the changes of or by the marking device do not have to be registerable by the human eye, and they may for example be changes in computer codes or other markings that may be sensed in the marking device.



## CLAIMS

1. A method of verifying that a packet or container is unruptured so that for example no one has been able to introduce harmful or irrelevant substances therein and that the packet or container in sealing becomes closely sealed,  
5 characterised in that a marking device is positioned on or in the packet or container and provides an indication if the packet or container is subjected to damage and is opened or is not closely sealed.
2. A method in accordance with claim 1, characterised in  
10 that the marking device is enclosed in an envelope or comprises the whole or a part of an envelope which gas impermeably is interconnected to the packet or the container, that the packet or container contains gas or has a vacuum, and that air that enters the packet or the  
15 container affects the marking device so that the latter provides a marking permanently or during a specific time interval.
3. A method in accordance with claim 1, characterised in that the marking device is enclosed in an envelope or  
20 comprises the whole or a part of an envelope which gas impermeably is interconnected to the packet or container, that the packet or container contains gas and has a vacuum and that the gas or the vacuum affects the marking device, with this effect being eliminated if air enters the packet  
25 or container permanently or during a specific time interval.
4. A method in accordance with claim 2 or 3, characterised in that the marking device consists of a label which if the packet or container is not impermeable changes entirely or partly in colour permanently or for a specific time  
30 interval.
5. A method in accordance with claim 2 or 3, characterised in that the marking device consists of a label with a bar code which if the packet or container is not impermeable changes its colour entirely or partly or which is  
35 supplemented with one or more bars or loses one or more bars or has one or more bars which change permanently or during a specific time interval.

6. A method in accordance with claim 2 or 3, characterised in that the marking device consists of a label with a bar code which is kept in order by the gas/vacuum and which becomes disordered, respectively, if air affects it permanently or for a specific time interval.
7. A method in accordance with claim 2 or 3, characterised in that the marking device consists of a label having a bar code which is unaffected by the gas/vacuum and which is affected by air, respectively, permanently or during a specific time interval.
8. A method in accordance with claim 1, characterised in that the marking device comprises a label provided with a bar code which may be read by a reading pen, said bar code being disposed over the place where the packet or container is to be opened, and that the reading pen when it is passed over the bar code immediately gives a warning if the label or bar code has been damaged, for example by having been ruptured.
9. A method in accordance with claim 8, characterised in that the warning of the reading pen is provided by means of an acoustical, visual or electrical signal.
10. A method in accordance with claim 8, wherein the warning of the reading pen is provided by means of an electrical signal, characterised in that in order for the next marking device to be able to be registered a countercode has to be delivered to the readout apparatus of the reading pen as a receipt that the warning signal has been perceived.
11. A method in accordance with claim 2 or 3, characterised in that the marking device consists of a label which is affected by light or darkness, i.e. lack of light.
12. A method in accordance with claim 2 or 3, characterised in that the marking device consists of a label which is affected by heat or cold.
13. A method in accordance with claim 1, characterised in that the marking device consists of elements which change their colour by the influence of gas, lack of air, and existence of air, respectively.

## AMENDED CLAIMS

[received by the International Bureau on 01 May 1989 (01.05.89)  
original claims 1-13 replaced by amended claims 1-9 (2 pages)]

1. A method of verifying that a packet or container is unruptured so that for example no one has been able to introduce harmful or irrelevant substances therein and so that the packet or container when being sealed becomes  
5 impermeably sealed, respectively, with a marking device being disposed on or in the packet or container and providing an indication if the packet or container becomes subjected to damage and is opened or is not closely sealed, characterised in that the marking device comprises a bar  
10 code which if the packet or container is not impermeable changes its colour entirely or partly or which is supplemented with one or more bars or loses one or more bars or has one or more bars which change permanently or for a specific time interval.
- 15 2. A method in accordance with claim 1, characterised in that the marking device with its bar code is kept in order by a gas or a vacuum and becomes disordered if air affects it permanently or for a specific time interval, respectively.
- 20 3. A method in accordance with claim 1, characterised in that the marking device with its bar code is unaffected by a gas or a vacuum and is affected by air permanently or for a specific time interval, respectively.
- 25 4. A method in accordance with claim 1, characterised in that the marking device with its bar code may be read out by means of a reading device which provides an indication if the bar code has changed.
- 30 5. A method in accordance with claim 1, characterised in that the marking device with its bar code may be read by means of a reading pen, with the reading pen when it is passed over the bar code providing an indication if the bar code has changed.
- 35 6. A method in accordance with claim 4, characterised in that the indication of the reading device is given by means of an acoustical, visual or electrical signal.
7. A method in accordance with claim 4, wherein the marking of the reading device is given by means of an

electrical signal, characterised in that in order for the next marking device to be registered a countercode has to be provided to the reading apparatus of the readout device as a receipt of an indicating signal having been perceived.

5 8. A method in accordance with any one of claims 1-7, characterised in that the marking device is affected by light or darkness, i.e. lack of light.

10 9. A method in accordance with any one of claims 1-7, characterised in that the marking device is affected by heat or cold.

Fig. 1A

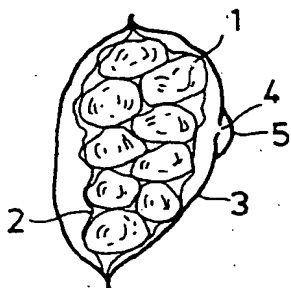


Fig. 1B

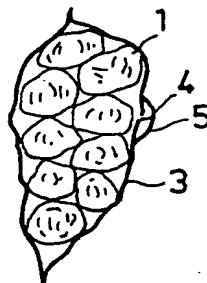


Fig. 1C

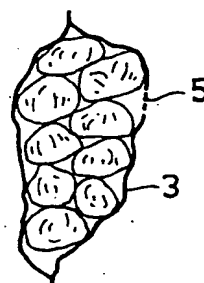


Fig. 2A

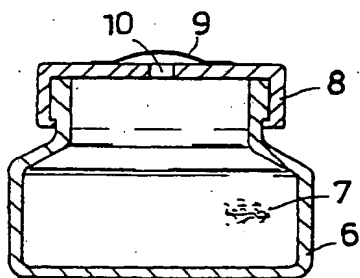


Fig. 2B

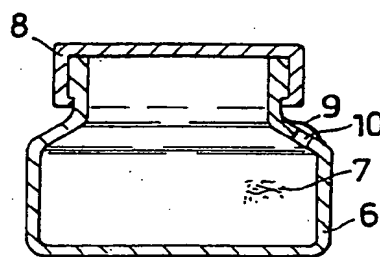


Fig. 3

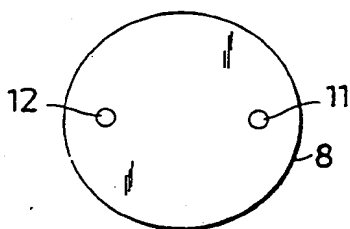


Fig. 4A

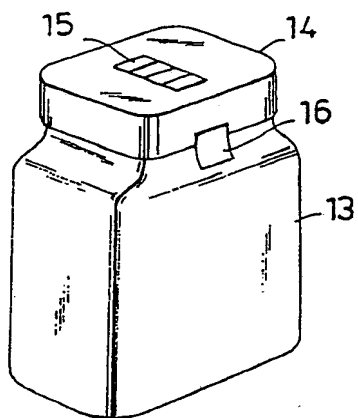


Fig. 4B

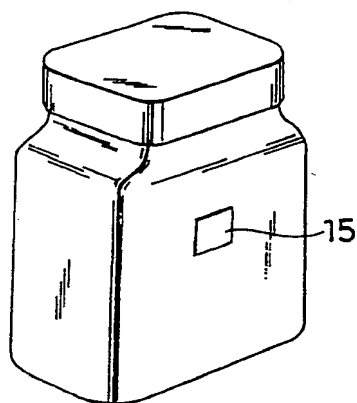


Fig. 5

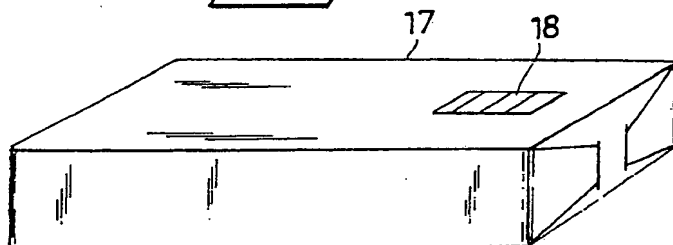


Fig. 6A

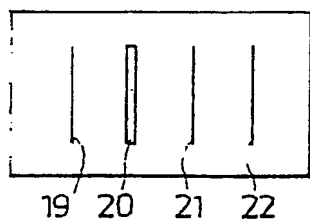


Fig. 6B

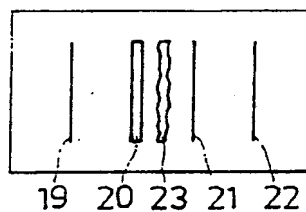
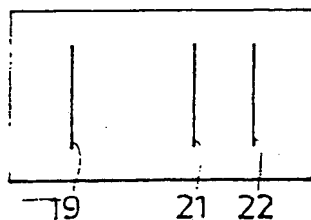



Fig. 6C



# INTERNATIONAL SEARCH REPORT

International Application No **PCT/SE88/00687**

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC 4		
B 65 D 55/02, 33/34, G 06 K 1/12		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched 7		
Classification System	Classification Symbols	
IPC 4	B 65 D 55/02, 33/34, 79/02; G 06 K 1/12; G 09 F 3/02; G 01 F 15/06; G 01 D 1/04, 3/00, 3/08	
US C1	206/459; 215/201, 206, 230; 220/214, 215, 231, 346, 359, 365; 116/200, 216, 210	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8		
SE, NO, FI, DK classes as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> 9		
Category *	Citation of Document, 11 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No. 13
X Y	SE, B, 407 927 (BIO-MEDICAL SCIENCES INC.) 30 April 1979 See page 3, ls 38-40, page 4, ls 1-5, claims 1-5, figure 4 and 5 & BE, 822378 NL, 7415281 FR, 2252619 DE, 2455422 US, 3899295 CH, 578977 GB, 1492377 US, 4098577 JP, 50085496 SE, 7414589	1-4, 13 5-12
Y	EP, A2, 0 117 390 (ALLIED CORPORATION) 5 September 1984 See abstract, page 14, ls 23-24, page 15, ls 25-35, page 20, ls 24-38, page 21, line 1 & JP, 59163543 CA, 1204300 AU, 576193	5-12
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p> </div> </div>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
1989-02-28		1989-03-06
International Searching Authority		Signature of Authorized Officer
Swedish Patent Office		 Rune Kirsten

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	EP, A2, 0 149 784 (ALLIED CORPORATION) 31 July 1985 See page 11, ls 21-34, page 12, ls 10-15, figure 7	5-12
A	DE, A1, 3 022 318 (ZDARSKY EDUARD) 24 December 1981 See claim 1	11
A	DE, A, 2 036 570 (WILHELM JACKSTÄDT & CO) 27 January 1972 See claim 1	12
X	US, A, 4 591 062 (SANDHAUS) 27 May 1986 See abstract & EP, 0186600	1-4, 13
X	US, A, 4 519 515 (SCHONBERGER) 28 May 1985 See abstract & EP, 0111900 JP, 59124274 US, 4480760	1-4, 13
A	EP, A1, 0 124 434 (SANGAMO WESTON, INC) 7 November 1984 See abstract, figure 2 and 5	1-12



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